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SOME RECENT DEVELOPMENTS OF SCHOOL STATISTICS.*

BY ROLAND P. FALKNER, *Assistant Director of the Census.*

Despite the fact that the system of public schools is deemed to be one of the fundamental bases of our national life, and that it absorbs for its maintenance a large share of the revenue raised by taxation, the American Statistical Association has hitherto given but scant attention to the statistical questions arising in this field of public adminstration. It is the purpose of the present paper to review some recent developments in the statistics of public schools, which have lifted these statistics out of perfunctory routine, have awakened the interest of progressive schoolmen, and which, in the writer's opinion, merit the attention of all who are interested in the application of statistical methods to problems of research and administration.

Save in isolated cases in individual cities, the problems of the common schools had, until recent years, neither attracted the attention of men trained in statistics, nor developed any especial statistical acumen among those charged administratively with the duty of preparing such figures for school reports. School reports, school journals, and the proceedings of educational bodies bear witness, especially in the last five years, to a new appreciation of the value of school statistics, though it would be difficult to trace it back to its origins.

The unit of presentation for facts concerning the schools is the school district, large or small as the case may be. To determine exactly where and when some special form of presenting the facts first appeared would be a matter of much research, with a result that would have rather a curious than a practical interest. For a broad general outline of recent developments, innovations are significant only when they have attracted more than local attention. This depends not so much upon the inherent value of any new method of presenting facts as upon the influence of those who adopt it.

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* Paper presented at the quarterly meeting of the American Statistical Association, Cosmos Club, Washington, D. C., April 14, 1911.

Of the most extensive influence in such matters is naturally the United States Bureau of Education. Then follow the several state bureaus, and the school systems of the larger cities. Initiative may, and often does, proceed from smaller cities, but it is only as it is recognized or adopted by the larger units that its influence reaches wider fields. The United States Bureau of Education, inadequately equipped even for its present duties, can only collect such statistics as the various school units may be willing to furnish. Until recently it has not attempted to go beyond a few simple facts of school enrollment, attendance, and expenditure. In the effort which has hitherto been its leading endeavor to present complete school statistics of all school districts in the United States it could not go very far into details. It has collected, in other words, mainly what was readily available, and apart from the standpoint of geographical distribution the material has not been especially significant. Of late years, the Bureau has, in addition to maintaining its general tables, been able to specialize, drawing more largely than before upon the willingness of school authorities to furnish information, and presenting in special studies more detailed facts for restricted areas.

Most of the state bureaus are even more inadequately equipped than the national bureau, and, like it, collect information on traditional lines. Some of them, however, are in a position to prescribe schedules, and possessing this power have developed a more fruitful activity. On the other hand, the heads of city systems have it absolutely in their power to collect and publish such figures as they deem proper, and use this power to a greater or less extent. The influence of the school report, however excellent, is largely local, except as the example of New York and other large cities may attract wider attention. In a general way, moreover, it is true that the larger the school system the greater is the elaboration given to the statistical showings. There are, of course, large cities woefully deficient in this respect as well as some smaller systems which excel in statistical presentations.*

The reports of the United States Bureau of Education before 1904 reflected the general status of school statistics throughout the country and the general interest in such figures. Information was given as to certain features of financial management; receipts, distinguishing between state, city, and county taxes or appropriations; and expenditures in four items, namely, permanent investment, teaching and supervision, current and incidental, and evening schools. The number of school buildings, their seating capacity, and the value of school property are also noted. That these figures are capable of considerable development, and that the cost of running the schools could be subdivided in many ways so as to bring out the cost of particular services is obvious. The Bureau of the Census, in co-operation with the Bureau of Education, has prepared a special schedule for the expenditures of city school systems which will give more detailed and more directly comparable information with especial relation to the different types of schools constituting the system. But this is a story by itself which can not be treated at length in this paper. Our present concern is particularly with the pupils of the schools. Regarding the latter, the following information was available in earlier reports of the national bureau: the total number of children enrolled in the schools, boys and girls being separately stated; and the annual average attendance.

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* Snedden (D. S.) and Allen (W. H.) School Reports and School Efficiency, 1908. Falkner "What Can and Do School Reports Show," *Psychological Clinic*, March, 1910.

The fundamental view of the general statistics of the Bureau of Education is to show how much of the public money is spent for schools and how many persons are the beneficiaries of the expenditure. If the question were raised whether the money was well spent the answer usually took the form of comparisons of per capita expenditures, rather than of any test of the efficiency of the school system. The recent developments which form the subject of this paper have grown out of the inquiry how far the school system as a whole is accomplishing the task it undertakes. This inquiry has led to the specific questions: how many children secure a common school education, how many fall short of it and why—problems which current discussion designates as those of survival, elimination, and retardation.

The first of these interests is that of survival and the first step towards an appreciation of its significance was a study of the number of pupils in each grade of the elementary schools. So simple a detail of school work as this has only recently been a common feature of school reports. Tables relative to grades in the schools first appeared in the Report of the Bureau of Education for 1898, when data covering twenty-four cities were assembled. No further note of grade numbers occurs until the report of 1903, which gives an account of the Bureau's exhibit at St. Louis. Based, so far as any evidence is presented, wholly upon estimates and not upon any original enumeration, the Bureau showed charts giving the grades of pupils of the United States, their ages, and the average age of entering the work of each grade.

The following report of the Bureau, for 1904, stimulated by the example of Superintendent Maxwell, of New York, gives more attention to the grades and to the ages within the grades. From the reports of fifty-eight cities, it assembles figures in regard to the numbers in each grade of the elementary schools. Two years later, in 1906, similar information is available in 127 cities. Up to this time, the information published by the Bureau was gathered from an examination of the school reports. In 1906–1907 the question was asked as a part of the regular schedule of the Bureau and replies were received from 752 cities and villages. Since then it has been a constant feature in the reports of the Bureau, though the reports have as yet refrained from any analysis of them, basing this on the dissimilarity of the data, which is sometimes reported on total enrollment, sometimes on the average enrollment, or by average attendance, or by other methods. Summarized, the development of the material is as follows:

SCHOOL YEAR.	CITIES.	CITIES AND VILLAGES.
1898	24	
1904	58	
1906	127	
1907	386	762
1908	532	1,040
1909	536	1,024

The development of the material is not without interest, but greater importance attaches to the interpretation of it. A typical distribution by grades is the following: giving the figures for Philadelphia in 1908:

Grades.	Numbers.	
	Absolute.	Relative for 1,000 in first grade.
First	26,741	1,000
Second	22,858	850
Third	21,858	817
Fourth	18,543	693
Fifth	15,001	561
Sixth	11,927	446
Seventh	7,869	294
Eighth	6,203	232

The instinctive interpretation of these figures is that as the eighth grade is only 23.2 per cent. of the number of the first grade that only 23.2 per cent. of the pupils entering the school reach the eighth grade. Such a conclusion is frequently drawn from figures of this sort, although the fallacies of such a conclusion have been carefully pointed out by authorities on school statistics.* This crude interpretation of the grade figures has two underlying assumptions, neither of which is correct:

a. That an equal number of children enter school annually, and that therefore the present eighth grade pupils are survivors of a class as large as the present first grade, which would be true only of a stationary population.

b. That all pupils stay only one year in a grade, and that therefore the first grade numbers are equal to the number who enter each year.

In his report for 1908, the State Superintendent of New York, Dr. A. S. Draper, presents a study of industrial education, in which he quotes the grade figures. He recognizes the first difficulty, and therefore compares the eighth grade of 1906 with the first grade of eight years earlier. His figures embrace twenty-five cities in New York State outside of the City of New York. The totals for these cities are given as follows:

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* Ayres (Leonard P.) "Laggards in Our Schools," New York, 1909. See especially Chapter III, Some Factors in Grade Distribution.

GRADE.	NUMBER OF PUPILS.	PER CENT. OF FIRST GRADE.
First	21,410	100
Second	17,524	82
Third	17,028	79
Fourth	15,918	74
Fifth	14,395	67
Sixth	12,464	58
Seventh	10,152	47
Eighth	8,517	40

Doctor Draper's comments on these tables show that he has failed to recognize the second difficulty. With the utmost frankness he says:

"Reflections upon this subject have led me to seek exact information, and I confess, with some humiliation, that it surprises me. The situation is even worse than I supposed. I have assumed that practically all the children who do not go to the high schools do finish the elementary schools. That is not the fact. It is clear that the larger number do not finish the elementary schools by the time they are fourteen, the age at which the law says they may leave school to go to work, and that this provision of the law very commonly leads parents to think that the time has come for them to go to work, notwithstanding the fact that they have not finished the lower schools, and notwithstanding the other fact that there is little remunerative work which they can do. There is often more of a break in attendance between the fifth and sixth grades of the elementary schools than there is between the elementary schools and the secondary schools." . . .

His statement is summarized in the following figures:

"I confess that it startles me to find that certainly not more than two fifths and perhaps not more than one third of the children who enter our elementary schools ever finish them, and that one half of them go beyond the fifth or sixth grade." *

It may be incidentally remarked that this statement shows that after all survival and elimination are only two aspects of the same problem, that of children leaving school at various stages throughout the school course.

* State of New York, Fourth Annual Report of the Education Department, 1907, p. 579 *et seq.* Falkner, Elimination of Pupils from School, *Psychological Clinic*, February, 1909.

The next important contribution to the subject was a pamphlet on "Elimination of Pupils from Schools," prepared by Prof. E. L. Thorndike, and published by the United States Bureau of Education in 1908. Professor Thorndike assembles data from twenty-three cities and comes to the following conclusion:

"(1) At least 25 out of 100 children of the white population of our country who enter school stay only long enough to learn to read simple English, write such words as they commonly use, and perform the four operations for integers without serious errors. A fifth of the children (white) entering city schools stay only to the fifth grade."

This conclusion is predicated on a table which shows for each city Doctor Thorndike's estimate of the percentage of pupils entering school who continue to the fourth and successive grades. The summary results are presented in the form of medians as follows:

Fourth Grade	90 per cent.
Fifth Grade	81 per cent.
Sixth Grade	68 per cent.
Seventh Grade	54 per cent.
Eighth Grade	40 per cent.

These conclusions, not so much in their general tenor as in the figures published for individual cities, raised a storm of protest. Dr. A. E. Winship, the editor of the *Journal of Education,* who can, upon occasion, turn his pen into a bludgeon, delivered some smashing blows at what he deemed to be Professor Thorndike's methods and held up the alleged results to ridicule.* The criticism was not conclusive because in fact the methods followed by Professor Thorndike in his bulletin are not fully disclosed. He informs us there that the process of estimating how many of the pupils who enter school reach a given grade is a task of much intricacy, and that his estimates involve several "corrections" of the original grade figures. But he adds: "It would be unprofitable to anyone except the critical student of statistical problems for me to rehearse the details of this tedious process of corrections." The vigorous attack of the *Journal of Education* was met with an equally staunch defense and Doctor Thorndike was able, by reason of his elusive statement as to the methods which he had followed, to point out triumphantly that the critic had not understood him.*

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* *Journal of Education,* April 16, and May 21, 1908.

The *Journal of Education* attacked Professor Thorndike's work at its weakest point. It directed attention not to the final result for the eighth grade but to the alleged loss in the first three grades, and combated the figures cited by the general experience of school authorities. That ten per cent. leave before reaching the fourth grade on the average, and that in New England cities such as Boston and Malden, the proportion is about fifteen per cent. is simply not in accord with fact. The objection is, and it is substantially correct, that no children leave school before reaching fourteen years of age, and that there are no children of this age in the first three grades. If then the estimates give too few survivors in the early grades, the proportions in the upper grades must be too small also.

Doctor Winship saw clearly that Professor Thorndike estimated the number of beginners too high, and believes that he has found the source of the error in the fact that the average of the first three grades is taken as the number of beginners. Doctor Winship says why count the first grade at all, even as a part of an average. Doctor Thorndike replies, in substance, that he does not take the average of the first three grades as the number of beginners, but only appears to do so.

In a more extended criticism of Professor Thorndike's methods and results, I have pointed out that wherever he makes a positive statement of how he secured the number of beginners, it can readily be demonstrated that his figures are too large.† It is pointed out, not only that large numbers of pupils repeat the early grades, but that the estimated number of beginners, according to Thorndike, is considerably larger than the successive generations of pupils who enter the schools. It is there suggested that since all children enter school but once, the number of a generation in the public schools is the best test of the number of beginners.

Later, Doctor Ayres applies this suggestion in his book already cited. He uses the average of the ages 7 to 12 as the approximate number of beginners and compares his results with those of Doctor Thorndike. For the final elementary grade, we find the following:

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* *Journal of Education*, May 21, 1908.

† Falkner, Elimination of Pupils from Schools; A Review of Recent Investigations, *Psychological Clinic* February, 1909.

PER CENT. CONTINUING TO FINAL GRADE IN 16 CITIES.

	Thorndike.	Ayres.
Lowest	14.4	28.0
Highest	49.4	68.8
Medium	33.3	48.6

The significance of this critical review lies in the fact that the study of grades can not reach correct conclusion without a concurrent study of ages in the grades. Using technical terms, becoming more and more familiar among schoolmen, elimination can not be understood without a reference to retardation.

Let us understand exactly what we mean by retardation before attempting to show the steps by which its discussion has come into prominence in recent years. That retardation of school children in general terms expresses a misrelation between the age of the children, and the grades appropriate to their age is more and more a generally accepted proposition. A table showing the age of the pupils in each grade is the accepted source of information. It is assumed that for each grade, there is a normal age and that pupils who are beyond this age are retarded or behind in their work. From a technical point of view it may be looked upon as the most effective and instructive condensation of a table of ages and grades. The accompanying table for Philadelphia makes this clear.

A cursory examination of the table by grades shows that pupils of the first grade range from 5 to 16 years of age. Similarly it will be seen that eleven-year-old pupils are in all the grades from first to eighth. Of the multitude of facts in this table, the last three lines give a concise expression. Heavy lines in each column separate in each grade the pupils of normal age or under, above the line, from those above normal age who are below the line. The latter added together are then compared with the total number of pupils. The last line shows us that, in Philadelphia, 42.2 per cent. are retarded, and that from 21.1 per cent. in the first grade, the proportion rises to 55.3 per cent. in the fourth grade, and then declines to 36 per cent. in the eighth. This rise and fall is repeated wherever observations have been made.

GRADES AND AGES OF PUPILS ATTENDING PHILADELPHIA SCHOOLS, DECEMBER 15, 1908.

Ages in Years.	Elementary Schools—Grades.								
	1	2	3	4	5	6	7	8	Total.
Under 5	5	......	......	......	......	......	......	......	5
5	1,000	......	......	......	......	......	......	......	1,000
6	11,841	255	1	1	......	......	......	......	12,098
7	8,244	5,641	330	3	......	......	......	......	14,218
8	3,528	7,635	4,518	312	1	......	......	......	15,994
9	1,137	4,510	5,929	3,186	257	6	......	1	15,026
10	503	2,463	5,013	4,778	2,660	247	5	......	15,669
11	250	1,123	3,044	4,352	3,929	2,191	258	12	15,159
12	143	663	1,853	3,335	3,906	3,538	1,924	219	15,581
13	63	323	902	1,933	2,950	3,476	2,681	1,619	13,947
14	19	101	223	541	1,022	1,754	1,953	2,117	7,730
15	6	12	40	90	225	552	795	1,470	3,190
16	2	......	5	10	46	133	212	582	990
17	......	1	......	1	3	25	39	145	214
18	......	1	......	......	2	5	2	32	42
19	......	......	......	......	......	......	......	5	5
20	......	1	......	1	......	......	......	1	3
Total	26,741	22,729	21,858	18,543	15,001	11,927	7,869	6,203	130,871
Over age	5,651	9,198	11,080	10,263	8,154	5,945	3,001	2,235	55,527
Per cent. over age	*21.1*	*40.4*	*50.6*	*55.3*	*54.3*	*49.0*	*38.1*	*36.0*	*42.4*

The development of an interest in retardation proceeded from two points widely separated geographically—New York City and Porto Rico—but through the return to the United States of Porto Rican officials, the two movements have been merged into one. In his report for 1904, the Superintendent of Schools in New York, Dr. W. H. Maxwell, developed the idea of the over-age or retarded pupil, and showed by his figures that some 39 per cent. of the pupils in the public schools were retarded. At the time his work stood practically alone. There was nothing to compare it with. Whether the percentage was high or low could not be known by a comparison with other places. It was, however, recognized by Doctor Maxwell that retardation was not a phenomena peculiar to New York schools, and he was interested in ascertaining the factors which produce retardation more than in measuring its amount. In the discussion which followed the publication of these facts, attention was frequently called to the defective physical condition of school children as determined by the medical inspection of schools. The conclusion was frequently drawn that physical defect was the main cause of backwardness, and Doctor Maxwell's studies exerted a stimulating influence upon the ever-spreading movement for medical inspection.

In its report for 1904, the Bureau of Education applies the concept of a normal age to other figures giving the age and grade distribution of pupils found in the reports of other cities. The whole number of cities in the list, including New York City itself, is only nine, and this represents presumably the information available at that time.

In the school year 1905–1906, the Department of Education of Porto Rico, then under my charge, undertook a complete reorganization of its statistical service. Information was gathered and presented regarding the age of pupils, the grades, the ages within the grades, the length of time in schools, the duration of enrollment, and other matters. In interpreting the figures thus gathered in Porto Rico, the effort of the Department was to show how far conditions found in the Island were normal as compared with the United States. A search through the available material showed me that comparable figures could rarely be obtained, that there was, at that time, no commonly accepted form of a grade distribution, or of an age distribution of the pupils in the elementary schools. But these studies brought to our attention the figures regarding the normal age as published in the report of the Bureau of Education before cited, and led to the application of this concept to the figures for Porto Rico. So far as we were able to determine statistically the causes of retardation, we were able to point out certain relations between retardation and irregularity of attendance, and, in general, our thought went in the direction of explaining the phenomena by certain facts of school life rather than attributing it to the mental or physical condition of the pupils concerned. In the statistical work of my department I was assisted by Dr. Leonard P. Ayres, who entered into the reorganization of the statistics with great intelligence and enthusiasm, and who developed, even at that time, a keen appreciation of the educational and statistical problems involved in the discussion. The work of the year 1906 was continued with more elaboration in the following year.

In 1907, Dr. Luther H. Gulick, of New York City, became much interested in the line of work which had been done in Porto Rico and the attitude which was expressed by Doctor Ayres and myself, that the main causes of retardation were not to be sought in the questions of the physical condition of school children. He interested at once the school authorities of New York, and the authorities of the Russell Sage Foundation, with the result that the latter body made an appropriation for an investigation of backward children and placed Doctor Ayres in charge. The primary object of this investigation was to ascertain directly the relation of retardation to physical defects and it was proposed, by concurrent examination of the records of medical inspection and of age and school standing, to determine how far physical defects contributed to the number of backward children. This investigation covered nearly 10,000 cases in selected schools in the Borough of Manhattan. A report on this investigation was submitted to the superintendent of schools and appeared in his annual report for 1908.

While this special investigation of New York City was going on, it was determined to select from the school reports all the data bearing upon retardation, and a very thorough search was made through the school reports of the one hundred largest cities for a period of ten years. The original intention was to combine these figures in a volume on the data of retardation which should be separate from the report on the New York City schools. The matters, however, were so intimately related and the figures for other cities threw so much light on the general situation that both lines of inquiry were finally combined in the work of Doctor Ayres, 1909, published by the Russell Sage Foundation, entitled "Laggards in Our Schools; A Study of Elimination and Retardation in the City School Systems." The example of Doctor Maxwell bore fruit elsewhere. Supt. James E. Bryan, of Camden, applied, in 1906, the same methods to the pupils of schools and carried them a few steps in advance. Interest in mentally backward children had received in Philadelphia a new impetus from the study of such children by Prof. Lightner Witmer, of the University of Pennsylvania, and the experimental work in the psychological clinic which he established, and the records of its work in the journal of the same name which he founded.* Doctor Witmer has offered in this journal an opportunity for the statistical as well as the psychological study of retardation, and has published a series of articles by Doctor Bryan; Dr. Oliver P. Cornman, associate superintendent of schools in Philadelphia; Doctor Ayres, and others.† It is significant of the increased interest in the matter that while, in 1904, the Bureau of Education could assemble figures showing the per cent. of retardation from nine cities only, Doctor Ayres, in 1909, gives us a list of thirty-one cities, showing a range of retardation from 7.5 per cent. of pupils in Medford, Massachusetts, to 75.8 per cent. of the colored pupils in Memphis, Tennessee. As the school reports of the various cities have come under my observation for the past two years, the prominent fact is the increase of interest in this matter and the growing volume of material which is available in the school reports.

Stimulated by these discussions, the United States Bureau of Education, in December, 1908, made a special inquiry as to the ages of the pupils attending each grade on a certain date. The results of this inquiry, embracing 318 cities, have not been published. The significance of the inquiry depends not only upon the large number of places involved, but more especially upon the uniformity in collecting the material which, for the first time, will give us directly comparable data for the different cities involved. As has already been pointed out the matter published in the city reports is, from a statistical point of view, quite varied. Some figures relate to the total enrollment during the year, others to the enrollment on a given date, sometimes early in the school year and sometimes late. It would take too long to explain how these differences vitiate the comparisons, but a single illustration will indicate the possibilities in the case. The city of Boston makes up one report in January and another report in July. If we figure the percentage of retardation on the July basis, it is always greater than if figured on the January basis, for the simple reason that the children are older at the end of the school year than they are in the beginning of it.*

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* *The Psychological Clinic;* edited by Lightner Witmer, Ph. D., Vol. I, March, 1907, to date.

† Bryan, J. E., A Method for Determining the Extent and Causes of Retardation in a City School System, *Psychological Clinic,* April, 1907.

Cornman, The Retardation of the Pupils of Five City School Systems, *Ibid,* February, 1908.

Falkner, Some Further Considerations upon the Retardation of the Pupils of Five City School Systems, *Ibid,* May, 1908. (In this review of Doctor Cornman's essay, I devote considerable attention to the diversity of the materials which he uses, and call attention to the problems of statistical methods which are raised in this diversity. Several chapters of Doctor Ayres' work, "Laggards in Our Schools," appeared as essays in this periodical.)

It is clear that the unknown difficulties arising from different methods of enumeration will be entirely eliminated in the reports which have been gathered directly by the United States Bureau of Education.

With the publication of the reports gathered by the Bureau of Education we shall have ascertained with considerable accuracy the measure of retardation in different places. The cause of retardation is, obviously, of quite as much interest as its measure. Various attempts have been made, in a speculative way, to assign the causes of retardation. The following have been suggested by various writers: (1) The foreign element in the population; (2) Age at starting school; (3) Irregular attendance; (4) Transfers; (5) Physical defects; and (6) Mental defects.

It can not be said that general discussion has thrown much light upon the significance of these alleged causes. The argument has too often been that a large percentage of the children are of foreign origin and that a large percentage of school children are retarded, and that, therefore, the principal cause of retardation is the foreign element, or that a large percentage of children are retarded and a large percentage are physically defective, and therefore physical defect is the principal cause of retardation. We shall concern ourselves briefly with attempts which have been made to measure, at least approximately, the force of these several causes.

One method of examining into the causes of retardation which naturally suggests itself is to secure the direct information from the teacher as to the causes in each individual case. This was attempted by Superintendent Bryan in Camden in 1906. In order to get comparable results, he found it necessary, after a tentative examination, to make up the schedule of main causes, to drill the teachers to an exact understanding of precisely what was meant by each category, and to consider that where two causes co-operated in the result that only one, which might be deemed the principal one, should be reported. The results of this inquiry are interesting. They are:

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* Falkner, "Further Consideration," etc., *Psychological Clinic*, Vol. II, p. 65.

(1) Percentage of excessive age due to age on entering school, 21.2 per cent. of all retarded pupils.
(2) Absence, 28.5 per cent.
(3) Slowness, 21 per cent.
(4) Dullness, 12 per cent.
(5) Poor health, 9.6 per cent.
(6) Physical defects, 3.96 per cent.
(7) Mental defects, 3.7 per cent.

It will be noted that this table gives no reference to the foreign element of the population since, as a result of a preliminary examination, Superintendent Bryan reached the conclusion that this was not an important factor in causing retardation. The method employed by Superintendent Bryan is only applicable under peculiar conditions and most attempts to examine into the relationship of other causes to the amount of retardation have assumed different forms.

The Foreign Element: Not because it is of first importance, but because it has given rise to an important investigation, which should be mentioned in this connection, the foreign element may be considered first. When the United States Immigration Commission was constituted it was proposed to include in its scope of work an investigation of the children of immigrants in the schools. This inquiry was intrusted to the writer. The first step was to secure information concerning the ages in the several grades, distinguished by nationality. This was done in December, 1908, in thirty-seven cities. The results of this inquiry have been tabulated but have not yet been printed. A preliminary abstract, issued by the Immigration Commission, gives us some interesting results. It is not proposed here to survey the entire inquiry, but only to draw upon that part of it which concerns retardation. The general results of this inquiry are given in the following table:

ALL ELEMENTARY SCHOOL PUPILS.

General nativity and race of father of pupil.	Total.	Retarded.	
		Numbers.	Per cent.
Native born:			
White	618.212	210.959	34.1
Negro	44.215	28.092	63.5
Total	663.735	239.661	36.1
Foreign born:			
Bohemian and Moravian	27.775	9.303	33.5
Canadian, French	8.744	3.771	43.1
Canadian, other	26.937	7.523	27.9
Danish	6.265	1.955	31.2
Dutch	3.306	1.028	31.1
English	50.611	17.061	33.7
Finnish	1.356	.375	27.7
French	7.630	3.374	44.2
German	190.340	66.892	35.1
Hebrew German	33.054	9.873	29.9
Hebrew Polish	20.499	7.475	36.5
Hebrew Roumanian	12.673	4.423	34.9
Hebrew Russian	173.849	60.482	34.8
Irish	77.135	27.046	35.1
Italian North	29.156	13.395	45.9
Italian South	70.602	34.281	48.6
Lithuanian	3.376	1.293	38.3
Magyar	5.140	1.816	35.3
Norwegian	16.675	5.656	33.9
Polish	21.695	10.426	48.1
Portuguese	4.657	2.094	45.0
Russian	4.124	1.458	35.4
Scotch	15.657	5.157	32.9
Slavak	3.209	1.292	40.3
Swedish	42.084	12.069	28.7
Welsh	2.986	.957	32.0
Total foreign born*	939.774	338.424	36.1
Grand total	1,603.509	578.085	36.1

* The total includes also representatives of other races not named in the foregoing list.

The comparison of the native white and foreign white element as represented in the percentage of pupils shows very slight differences in the aggregate. The analysis of the foreign white element shows considerable diversity among the races represented in the table. The children of fathers from the British Isles, except Ireland, and from the Scandinavian countries show less retardation than the native white. The same is true of the Bohemian, the Canadian other than French, the Dutch, and the Finnish groups. All others have greater retardation which is most marked in the case of the Italian, Polish, and Portuguese groups.

The differences in the several races suggest that the composition of the foreign parentage group has much to do with the total result. In a further investigation on the more extensive plan of a separate schedule with a great deal of detail for each pupil, records of upwards of 60,000 pupils in other cities and in selected schools in some of the larger cities were examined and tabulated. The main results of this tabulation, which however includes only those pupils who had attained the age of eight years and upward, are as follows:

ELEMENTARY SCHOOL PUPILS, 8 YEARS OF AGE AND OVER.

Parentage and Nativity.	Number.	Retarded.	
		Number.	Per cent.
Pupils of native-born parents:			
White	16,881	4,748	28.1
Negro	1,000	668	66.8
Indian	23	11	47.8
Total native born	17,904	5,427	30.3
Pupils of foreign-born parents:			
English speaking races	5,295	1,448	27.3
Non-English speaking races	23,637	10,252	43.4
Total foreign born	28,932	11,700	40.4
Grand total	46,836	17,127	36.6
Included among pupils of foreign parents:			
German	4,137	1,359	32.8
Hebrew Russian	5,484	2,295	41.8
South Italian	2,978	1,894	63.6
Pupils of all races who were themselves born abroad	6,761	4,169	61.7

In this table there is a wide divergence between the percentage of retardation for the native white group and for the foreign white. The cause of this greater divergence is seen in the analysis of the latter group. The children of immigrant fathers, who spoke English as their mother tongue, is about the same as for the children of native white parents. The divergence is found among children of immigrant fathers who did not speak English as a mother tongue, and this group is relatively large. Because it is large the proportion of children born abroad is relatively large also. Such children as the table shows, have considerably more than half their number in the retarded class.

The abstract prints special tables which give more data in regard to three of the important races. The figures follow:

PERCENTAGE OF PUPILS, 8 YEARS OF AGE AND OVER, WITH FOREIGN-BORN PARENTS, WHO ARE RETARDED.

	German.	Hebrew Russian.	South Italian.
Pupils whose fathers speak English	31.7	34.9	59.2
Pupils whose fathers do not speak English	40.6	66.6	72.7
Pupils whose fathers are naturalized or have first papers	31.6	36.4	82.1
Pupils whose fathers are aliens	42.6	59.4	71.2
Pupils whose fathers have been under 5 years in the United States	67.4	74.6	82.1
Pupils whose fathers have been 5–9 years in the United States	41.9	57.2	75.2
Pupils whose fathers have been 10–19 years in the United States	33.4	31.9	61.6
Pupils whose fathers have been 20 years or more in the United States	31.1	29.7	55.4

This percentage table shows that the proportion of retarded children is greater among those of Hebrew-Russian parents than of German parents, and still greater among those of South Italian parents. It shows greater retardation in each case where the father does not speak English, and where the father is an alien. The proportion of retarded children diminishes also with the length of time the parents have been in the United States. Here the comparison of the German and the Hebrew-Russian is particularly instructive. It appears that with longer residence in the United States, the latter make the better showing. If, in the aggregate, the Hebrew-Russian rank below the German it is because a larger proportion of the fathers have been less than ten years in this country and because a larger proportion of the children were themselves born abroad.

Late Entrance: Much more important as a cause of retardation, as it has been defined in this paper, is the fact that certain children begin their schooling relatively late in life. By the terms of our definition, an eight-year-old child in the first grade is retarded. Some children do not begin school until they are eight years of age, and in but a few places does the law compel them to do so. Some critics have raised the question whether such a child ought to be considered retarded if he then proceeds through the grades without interruption.* The defense of the common usage is, that retardation represents a state of facts and is not concerned with the process by which that state of facts arose; that whether a child is older

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*Greenwood, (J. M.) Miring in the Grades and the Promotion of Pupils, *Educational Review*, Sept., 1908; and Falkner, Retardation: Its Significance and Its Measurement, *Ibid*, Sept., 1909.

than the normal age of his grade because he enters late, or entering early, because he fails to progress, he is at any given time retarded with respect to his fellows of the same age.

It is a mistake to suppose that many children enter school late. An examination of our age figures for Philadelphia shows very little difference between the number reported at seven years of age and that reported at eight years of age. Materials gathered by the Immigration Commission on the age of entering school are unfortunately not as yet available.

The inquiry of Doctor Ayres in New York City touched directly upon this question. He reaches the following conclusions: That of one hundred retarded children, thirty are retarded because of late entrance; thirteen because of a combination of late entrance and of slow progress; and fifty-seven because of slow progress only.

Transfers: Another cause of retardation is the fact that children lose time when they change schools. On this point the Immigration Commission gathered evidence in regard to the shifting of population and change of schools. The percentage figures from the abstract for the native group are:

PERCENTAGE OF PUPILS OF NATIVE FATHERS, 8 YEARS OF AGE AND OVER, WHO ARE RETARDED.

Pupils born in city of enumeration	26.7
Pupils born elsewhere in the United States	31.6
Pupils born elsewhere who had attended school elsewhere	35.0
Pupils born elsewhere who had not attended school elsewhere	27.3
Pupils entering present grade by promotion	22.9
Pupils entering present grade by transfer	37.9
Pupils entering present grade by non-promotion	58.8

Children born in the city where they are now attending school have somewhat less retardation than those born elsewhere. Among the latter are many, no doubt, who were brought to the city before they reached the school age and whose schooling has not been interrupted. If we divided them accordingly as they have attended school in other cities or not we find that the former group has the largest retardation. This evidence of the effect of transfers was supplemented by an inquiry as to how the pupils reached their present grade. It appears that those entering by transfer from the other schools are more retarded than those who came there by promotion.

Irregular Attendance: The divergence between the total enrollment of schools and the average attendance is familiar to schoolmen, though the reasons for the divergence have never been thoroughly analyzed. In some cities, we know not only the average attendance, but the number of days attended by the different pupils. From these figures Doctor Ayres draws the conclusion that such figures as are available indicate that in our cities less than three fourths of our children continue in attendance for less than three fourths of a year. In a very few cases, we have numerical evidence of the obvious fact that this affects promotions, and can readily see how this would bring about retardation among the pupils. He has established an interesting parallelism between the percentage of defective attendance and the percentage of retardation in a number of cities.*

More direct evidence on this point was gathered by the Immigration Commission and resulted in showing that among those pupils who, during the past year, had attended three fourths of the school days the percentage of the retarded pupils was 26 per cent., while the pupils who had attended for a less period the percentage was 44.0 per cent. The significance of these figures will be appreciated when it is remembered that the attendance is not being compared with the promotions at the end of the term. They show present status and the attendance of the period under consideration is considered as typical of the attendance of pupils throughout their school career.

Physical Defects: That there is a relation between school progress and physical defect, in some cases, is obvious. That the child of defective hearing is handicapped needs no explanation; that the child of defective vision suffers, at least until the defect is corrected by glasses, is also obvious. On the other hand, the only investigation which has directly correlated physical defect and school progress fails completely to show that physical defects are a predominant cause of retardation in the schools. The reason for this is that we lack definitions for physical defects which are in direct relation to school work.† For instance, except in rare cases, such minor physical ailments as defective teeth have little to do with the mental activity, and it might be said that certain physical defects contribute to mental activity by restricting the physical activity of the child. There is no reason on earth why a lame boy should not be a good student. The definitions of physical defects have been made by the doctors, and they have been made with reference to the perfect human being. Taken in the absolute sense, there are few of us who are without physical defects and yet we are not handicapped in the race for life. The conclusions of Doctor Ayres' investigations on this topic are extremely interesting, but lack of space precludes even a summary here. It would seem that a direct correlation between physical defects and school progress must await a standardizing of terms and definitions which is conspicuously lacking in the reports of the medical inspection.

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* Ayres, L. P., "Laggards in Our Schools," pp. 132-140.
† Ayres, L. P., "Laggards in Our Schools," pp. 117-131.

This rapid summary of what has thus far been accomplished in the investigation of retardation shows it to be the result of many factors working concurrently. These may be broadly stated as being of four classes:

(1) Factors arising from social conditions in the country;

(2) Factors growing out of the physical and mental characteristics of pupils;

(3) Factors growing out of the school habits of children; and

(4) Factors arising from methods of school administration.

This division shows that the problem with which we are dealing is a general problem and that the amount of retardation is not necessarily a reflection upon the school system of a given community. It does show, however, a considerable amount of waste in school work, and the study of the question, so far as it has gone, has greatly stimulated the investigation as to what are the causes and what are the remedies. This investigation has already had fruitful results in school administration, leading, as it has done, to a more thorough study of such questions as transfers, promotions, whole-year and half-year grades, and similar adjustments of the school systems to the needs of the children.

In this brief review, it has been possible merely to indicate certain general lines of inquiry rather than to describe the detailed statistical problems which arise concerning them.

It has, I trust, been made clear in the course of the treatment, that a full answer to the questions involved means a considerable extension of the statistical data commonly collected in regard to schools. From the consideration of the grades, we passed to the question of ages and to the ages within the grades. In the examination of causes, we touched upon several factors capable of statistical elucidation; the nationality and race of pupils; the ages of pupils with reference to beginning school; the number of transfers from one school to another the degree of attendance by classes; and perhaps the physical defects of children. Each of these is capable of considerable elaboration and is receiving it in different centers. It has not been our purpose to exhibit these efforts in detail but to dwell upon the general lines of these recent developments and to show the underlying causes which have stimulated recent activity in statistical discussion and practice.

The need of further details for administrative purposes is more and more recognized,* and the practical method of securing the information needed is receiving attention. Progressive schoolmen have now come to look upon their schools as having a definite object, namely, the carrying forward of the greatest number of pupils to the most advanced point possible, and they are testing their schools with this in view. It is not unlikely that these purposes will lead to fundamental changes in the record-keeping of schools and the assembling of data concerning schools. In various cities the general register has given place to the individual card and the thought has been expressed that a card-record could be devised which would follow the pupil throughout his school career; whether it is in one school or several, or whether it is in one city or two, and that by means of such records far more accurate results could be obtained than under those which are at present current. To go back to the earlier observation, I should state in conclusion that, in my opinion, the characteristic point in the recent developments of school statistics, which have been briefly and inadequately sketched in this paper, is the tendency to establish methods which shall test the actual efficiency of the school work.

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* Falkner, "Some Uses of Statistics in the Supervision of Schools," *Psychological Clinic*, January, 1909.